



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

## NOTICE OF ALLOWANCE AND FEE(S) DUE

22428 7590 06/08/2010

FOLEY AND LARDNER LLP  
SUITE 500  
3000 K STREET NW  
WASHINGTON, DC 20007

EXAMINER

HU, FRED H.

ART UNIT

PAPER NUMBER

2624

DATE MAILED: 06/08/2010

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

I0/594,897

09/29/2006

Atsushi Hatabu

040447-0286

8320

TITLE OF INVENTION: TEMPLATE MATCHING METHOD, TEMPLATE MATCHING APPARATUS, AND RECORDING MEDIUM THAT RECORDS PROGRAM FOR IT

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	09/08/2010

**THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.**

**THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.**

### HOW TO REPLY TO THIS NOTICE:

#### I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

**IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.**

# **PART B - FEE(S) TRANSMITTAL**

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
or Fax (571)-273-2885**

**INSTRUCTIONS:** This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

22428 7590 06/08/2010

**FOLEY AND LARDNER LLP  
SUITE 500  
3000 K STREET NW  
WASHINGTON, DC 20007**

**Note:** A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

## **Certificate of Mailing or Transmission**

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/594,897	09/29/2006	Atsushi Hatabu	040447-0286	8320

**TITLE OF INVENTION: TEMPLATE MATCHING METHOD, TEMPLATE MATCHING APPARATUS, AND RECORDING MEDIUM THAT RECORDS PROGRAM FOR IT**

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	09/08/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
HU, FRED H.	2624	382-209000

**1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).**

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

**2. For printing on the patent front page, list**

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 \_\_\_\_\_
- (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 \_\_\_\_\_
- 3 \_\_\_\_\_

**3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)**

**PLEASE NOTE:** Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

**4a. The following fee(s) are submitted:**

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies \_\_\_\_\_

**4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)**

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number \_\_\_\_\_ (enclose an extra copy of this form).

**5. Change in Entity Status (from status indicated above)**

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

**NOTE:** The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature \_\_\_\_\_

Date \_\_\_\_\_

Typed or printed name \_\_\_\_\_

Registration No. \_\_\_\_\_

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.**

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/594,897	09/29/2006	Atsushi Hatabu	040447-0286	8320
22428	7590	06/08/2010	EXAMINER	
FOLEY AND LARDNER LLP SUITE 500 3000 K STREET NW WASHINGTON, DC 20007			HU, FRED H.	
			ART UNIT	PAPER NUMBER
			2624	
DATE MAILED: 06/08/2010				

## Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 654 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 654 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

**Notice of Allowability**

Application No.

10/594,897

Examiner

FRED HU

Applicant(s)

HATABU, ATSUSHI

Art Unit

2624

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 16 February 2010.
2. ☒ The allowed claim(s) is/are 1, 3, 5-7, 9, 11-13, 15, 17-18 (now renumbered 1-12 for issue).
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some\* c) ☐ None of the:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
- \* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date 01/15/2010
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

/FRED HU/  
Patent Examiner, Art Unit 2624

### EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with George C. Beck (Reg. No. 38,072) on 06/02/2010.

The application has been amended as follows:

**Claim 1** reads:

A template matching method of detecting a position of an image region similar to a template image region from on a reference image, said method comprising the steps of:

calculating a similarity of the image region to the template image region at rough position intervals;

estimating a similarity at a position, where the similarity is not calculated, making use of directional gradients of similarity obtained independently in a plurality of directions from the calculated values of similarity;

determining, based on the calculated values of similarity obtained in the calculating step and the estimated value of similarity obtained in the estimating step, a position having a small calculated or estimated value of the similarity as a position of a similar image region; and

restricting a value range of the estimated similarity value such that a difference between the estimated similarity value and the similarity of a periphery used for the estimation or the gradient of the similarity does not exceed a threshold value,

wherein the calculating step, estimating step, determining step and restricting step are performed by a processor.

**Claim 3** reads:

A template matching method according to claim 1, further comprising detecting the position of the similar image region at a search step before the final step thereof.

**Claim 5** reads:

A template matching method according to claim 1, further comprising a step of determining the threshold value based on a magnitude of the similarity calculated from the template image region and an image region, which is obtained by moving the template image region in a same direction or in a opposite direction to an estimation direction vector obtained by subtracting a position of a nearby image region from a position where the similarity is estimated.

**Claim 6** reads:

A template matching method according to claim 1, further comprising a step of estimating, when five reference image regions A, B, C, D, E are sequentially located on a straight line, a degree of similarity at the image region C from an interpolation value extrapolated assuming gradient continuity from a similarity in the image regions A, B and from an interpolation value extrapolated assuming gradient continuity from a similarity in the image regions D, E in the estimation of the degree of similarity.

**Claim 7** reads:

A template matching apparatus for detecting the position of an image region similar to a template image region from on a reference image, comprising:

means for calculating a similarity of the image region to the template image region at rough position intervals;

means for estimating a similarity at a position, where the similarity is not calculated, making use of gradients of the similarity obtained independently in a plurality of directions from the calculated values of similarity;

means for determining, based on the calculated values of similarity obtained by the means for calculating and the estimated value of similarity obtained by the means for estimating, a position having a small calculated or estimated value of the similarity as a position of a similar image region; and

means for restricting a value range of the estimated similarity value such that a difference between the estimated similarity value and the similarity of a periphery used for the estimation or the gradient of the similarity does not exceed a threshold value.

In **Claim 11**, on line 1, after "A template matching" please delete "method" and insert "--apparatus--". Also, on line 4, please replace "the same direction" with "--a same direction--". Similarly, on line 5, please replace "the opposite direction" with "--a opposite direction--".

**Claim 12** reads:

A template matching apparatus according to claim 7, further comprising means for estimating, when five reference image regions A, B, C, D, E are sequentially located

Art Unit: 2624

on a straight line, a degree of similarity at the image region C from an interpolation value extrapolated assuming gradient continuity from a similarity in the image regions A, B and from an interpolation value extrapolated assuming gradient continuity from a similarity in the image regions D, E in the estimation of the degree of similarity.

**Claim 13** reads:

A non-transitory computer readable recording medium that records a program for causing a computer to execute a template matching method of detecting the position of an image region similar to a template image region from on a reference image, wherein:

the method calculates a similarity of the image region to the template image region at rough position intervals;

the method estimates a similarity at a position, where the similarity is not calculated, making use of gradients of similarity obtained independently in a plurality of directions from the calculated values of similarity;

the method determines, based on the calculated values of similarity obtained in the calculating step and the estimated value of similarity obtained in the estimating step, a position having a small calculated or estimated value of the similarity as a position of a similar image region; and

the method restricts a value range of the estimated similarity value such that a difference between the estimated similarity value and the similarity of a periphery used for the estimation or the gradient of the similarity does not exceed a threshold value.

In **claim 15**, on line 1 before “computer readable recording medium”, please insert –non-transitory--.



In **claim 17**, on line 1 before “computer readable recording medium”, please insert –non-transitory--.

In **claim 18**, on line 1 before “computer readable recording medium”, please insert –non-transitory--.

***Response to Amendment***

2. The amendment received 02/16/2010 has been entered in full.

***Response to Arguments***

3. Applicant’s arguments, see pages 6-9, filed 02/16/2010, with respect to the pending claims have been fully considered and are persuasive. The rejection of the pending claims has been withdrawn.

***Allowable Subject Matter***

4. Claims 1, 3, 5-7, 9, 11-13, 15, and 17-18 are allowed.
5. The following is an examiner’s statement of reasons for allowance: the claims are allowable due to the persuasive arguments of the Applicant, see pages 6-9.

Regarding claim 1, 7, 13, and all respective dependent claims, closest art of record does not disclose all limitations. Specifically, Shimizu discloses a template matching method that calculates a similarity of an image region at rough position intervals, estimates the similarity at positions where the similarity is not

Art Unit: 2624

calculated, and then determines the position where the calculated/estimated similarity is small.

However, the above-cited reference fails to disclose, teach, or suggest restricting a value range of the estimated similarity value such that a difference between the estimated similarity value and a similarity of a periphery used for the estimation or the gradient of the similarity does not exceed a threshold value.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to FRED HU whose telephone number is (571)270-7689. The examiner can normally be reached on M-Th, 8am-4pm est..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Samir Ahmed can be reached on (571) 272-7413. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2624

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/F. H./

Examiner, Art Unit 2624

/Samir A. Ahmed/

Supervisory Patent Examiner, Art Unit 2624